

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 April 2000 (27.04.2000)

PCT

(10) International Publication Number
WO 00/024216 A3

(51) International Patent Classification⁷: **H04Q 7/38**,
G06F 17/30

(21) International Application Number: PCT/SE99/01766

(22) International Filing Date: 5 October 1999 (05.10.1999)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/177,457 22 October 1998 (22.10.1998) US

(71) Applicant: TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE).

(72) Inventor: FOTI, George; 2967 Lake Road, Dollard des Ormeaux, Quebec, H9B 2M1 (CA).

(74) Agent: ERICSSON RADIO SYSTEMS AB; Common Patent Dept., S-164 80 Stockholm (SE).

(81) Designated States (*national*): AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

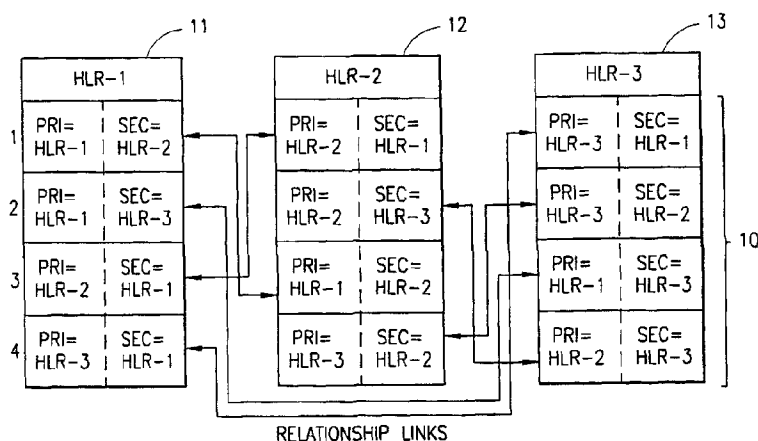
Published:

— with international search report

(88) Date of publication of the international search report:
11 July 2002

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DYNAMIC HLR REDUNDANCY IN A RADIO TELECOMMUNICATIONS NETWORK



(57) **Abstract:** A system and method of providing dynamic redundancy of home location registers (HLRs) for a plurality of subscribers in a radio telecommunications network having a plurality of HLRs (11-15), each of which has excess memory capacity for storing subscriber records. Each of the HLRs in the network operates as both a primary HLR and a secondary HLR. Subscriber records (10) in each HLR are divided into a plurality of subsets of known size. For each subset of records in a particular HLR, another HLR in the network is designated as the secondary HLR. The primary HLR (11) and the secondary HLR (12) for each subscriber are identified to the network through new subscriber categories. A heartbeat signal is periodically sent back and forth between the primary HLR and the secondary HLR in each HLR pair to convey the operational status of each HLR in the pair. If the heartbeat signal is not received in a secondary HLR, the secondary HLR sends to the network a Qualification Directive (QUALDIR) Invoke message directing the network (21) to utilize the secondary HLR sending the message as the new primary HLR for the assigned subset. The secondary HLR records all changes made to its subscriber records until the primary HLR is operational, and the heartbeat signal is resumed. The secondary HLR then updates the primary HLR, and the primary HLR is redesignated as the primary HLR.



WO 00/024216 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01766

A. CLASSIFICATION OF SUBJECT MATTER		
IPC7: H04Q 7/38, G06F 17/30 According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC7: H04Q, G06F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5555404 A (OYSTEIN TORBJONSEN ET AL), 10 Sept 1996 (10.09.96), column 1, line 50 - line 62; column 2, line 2 - line 4; column 2, line 14 - line 16, abstract, column 2, line 20 - line 56	1-2, 4-5, 7-11, 13-19
X		20
A		3, 6, 12
Y	WO 9621981 A2 (TELEFONAKTIEBOLAGET LM ERICSSON), 18 July 1996 (18.07.96), page 3, line 22 - line 25; page 3, line 37 - page 4, line 8; page 8, line 34 - page 9, line 6, abstract	1-2, 13-14
A		3-12, 15-19
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
<p>* Special categories of cited documents</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"Z" document member of the same patent family</p>		
Date of the actual completion of the international search		Date of mailing of the international search report
27 April 2000		30.05.2000
Name and mailing address of the International Searching Authority European Patent Office P.O. Box 5818 Patentplan 2 NL-2280 HV Rijswijk Tel: (+31-70) 340-2040, Tx 31 651 epo nl, Fax: (+31-70) 340-8816 1 document (NO).		Authorized officer Benny Andersson/cs Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/01766

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 9741703 A1 (ERICSSON INC.), 6 November 1997 (06.11.97), page 11, line 1 - line 10; page 13, line 7 - line 16; page 20, line 36 - page 21, line 13, abstract, page 22, line 3 - line 32	4-5,7-11, 15-19
A	-- -----	1-3,6,12-14

INTERNATIONAL SEARCH REPORT
Information on patent family members

02/12/99

International application No.
PCT/SE 99/01766

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
US	5555404	A	10/09/96	US	5423037	A	06/06/95
WO	9621981	A2	18/07/96	AU	4460796	A	31/07/96
				CA	2209900	A	18/07/96
				EP	0804842	A	05/11/97
				FI	972958	A	12/09/97
				JP	10512122	T	17/11/98
				US	5623532	A	22/04/97
WO	9741703	A1	06/11/97	AU	2819797	A	19/11/97
				CA	2253266	A	06/11/97
				EP	0896781	A	17/02/99
				US	5953662	A	14/09/99